Final Sewer Report

For

Destination at Gateway (Berge) Offsite

City of Mesa, Arizona

Developer
Diversified Partners, LLC
7500 E. McDonald Drive, Suite 100A
Scottsdale, AZ 85250

Project No. 20-1076

Date: November 2020
Revised: December 2020

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epsgroupinc.com

Table of Contents

Exhibits

1.0 Introduction

Destination at Gateway (Berge) Offsite (the Project) is a proposed commercial property bounded by Williams Field Road on the north and bisected by Signal Butte Road. The Project is located in a portion of land lying in Section 35 & 36, Township 1 South, Range 7 East of the Gila Salt River Base and Meridian in Maricopa County, Arizona.

2.0 Report Scope

This report has been prepared to address sanitary sewer demand calculations for the Project and the upstream Destination at Gateway residential subdivision project while demonstrating compliance off the offsite sewer infrastructure with the design criteria set forth in the City of Mesa Engineering Design Standards, dated 2019, and by the Flood Control District of Maricopa County.

Wastewater flow from the Project will be connect to 8-inch sewer stubs and convey flow north through a 10-inch gravity line to the intersection of Signal Butte Road and Williams Field Road. At Williams Field Road, a new 15" sewer will flow to the west to the connection point which is a an existing 15-inch sewer stub in Williams Field Road from Phase 3 Williams Field Improvement Plans of Cadence at Gateway (Prepared by EPS Group, Inc). A new 12" sewer line will also be extended to the east from the intersection of Signal Butte and Williams Filed Rd. to receive flow from the upstream Destination at Gateway residential subdivision project. See Exhibit A for the sewer design layout.

Internal sewer lines will be sized as part of the onsite design.

3.0 Existing Conditions

The new sewer will connect to an existing 15-inch sewer stub in Williams Field Road from Phase 3 Williams Field Improvement Plans of Cadence at Gateway (Prepared by EPS Group, Inc).

4.0 Sewer System Design Criteria

The capacity of sewer flow and pipe sizing in this report are based on system design criteria in the City of Mesa Engineering Design Standards dated 2019, as well as Title 18, Chapter 9 of the Arizona Administrative Code, and regionally accepted design standards.

The Project is zoned as GC-CUP, or General Commercial that designates use classifications permitted on approval of a Council Use Permit, per the City of Mesa Zoning Ordinance. The average daily wastewater flow for a general commercial development, is outlined in Table 4.2 of Section 411 of the City of Mesa Engineering Design Standards. The value given for Commercial/Retail developments is 0.5 GPD per square foot. An

estimate for building square footage was developed based on similar uses in the area (car dealerships) and the site area. A 10% building lot coverage was used based on this analysis.

The Project has a gross acreage of approximately 89-acres which results in a contributing flow from the proposed development of 174,161 GPD. Upstream contributing flow from the Destination at Gateway residential subdivision

Once the sewer line in Signal Butte Road merges with the line in Williams Field Road the combined flow from the upstream Destination at Gateway residential subdivision increases to 205,481 GPD.

Peak flow and Manning's Equation (n = 0.013 for PVC pipe) determined pipe diameter. Pipes were sized to maintain the depth of flow of less than 67% of the pipe diameter.

A peaking factor of 3.0 was applied to the average daily wastewater flows of less than 1.0 MGD, as outlined in Section 411 of the City of Mesa Engineering Design Standards. This peaking factor accounts for peak usage and wet weather flows.

The total calculated average day sewer flow for the project is 205,481 GPD and peak hour demand amounts to 616,442 GPD. Please refer to Exhibit C for further details.

4.1 Design Capacity

The sewer network for the Project will have a capacity that allows flow of wastewater to maintain a velocity of 2.0 fps or greater when flowing 2/3 full. Minimum slopes to meet this minimum velocity requirement are 0.25%, 0.20% and 0.14% for10-inch, 12-inch and 15-inch lines respectively.

Line Capacity (Q):

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Where
- n = 0.013
- A= Cross Sectional Area
- R = Hydraulic Radius
- S = Slope

The peak capacity of 10" Sewer at 0.25% slope flowing 2/3 full is 555,300 gpd, with a velocity of 2.23 fps.

The peak capacity of 12" Sewer at 0.20% slope flowing 2/3 full is 808,500 gpd, with a velocity of 2.25 fps

The peak capacity of 15" Sewer at 0.14% slope flowing 2/3 full is 1,227,000 gpd, with a velocity of 2.22 fps

5.0 Conclusion

This Sewer Report has analyzed the design for the layout, density, and capacity for the Destination at Gateway – Berge Offsite and Mass Grade development and has been designed to meet City of Mesa Engineering Design Standards, dated 2019, as well as Title 18, Chapter 9 of the Arizona Administrative Code and regionally accepted design standards.

This report shows that sufficient capacity has been provided for the project to capture and convey demand from the future proposed improvements.

EXHIBIT A

VICINITY MAP

VICINITY MAP

N.T.S.

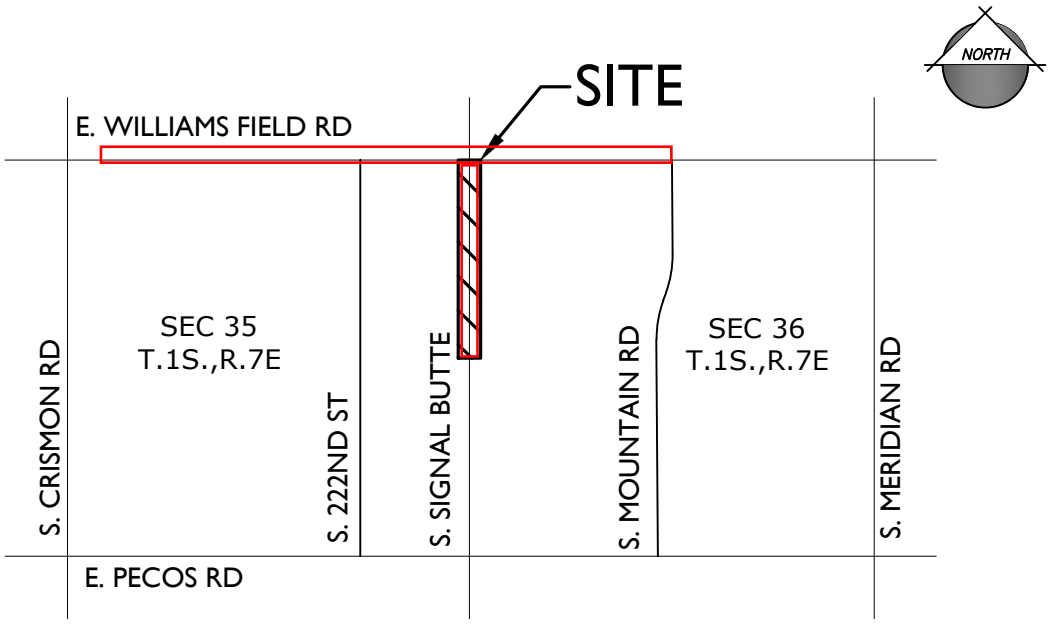

EXHIBIT B

SEWER EXHIBIT

20-1076: Destination @ Gateway - Berge - Offsite and Mass Grade

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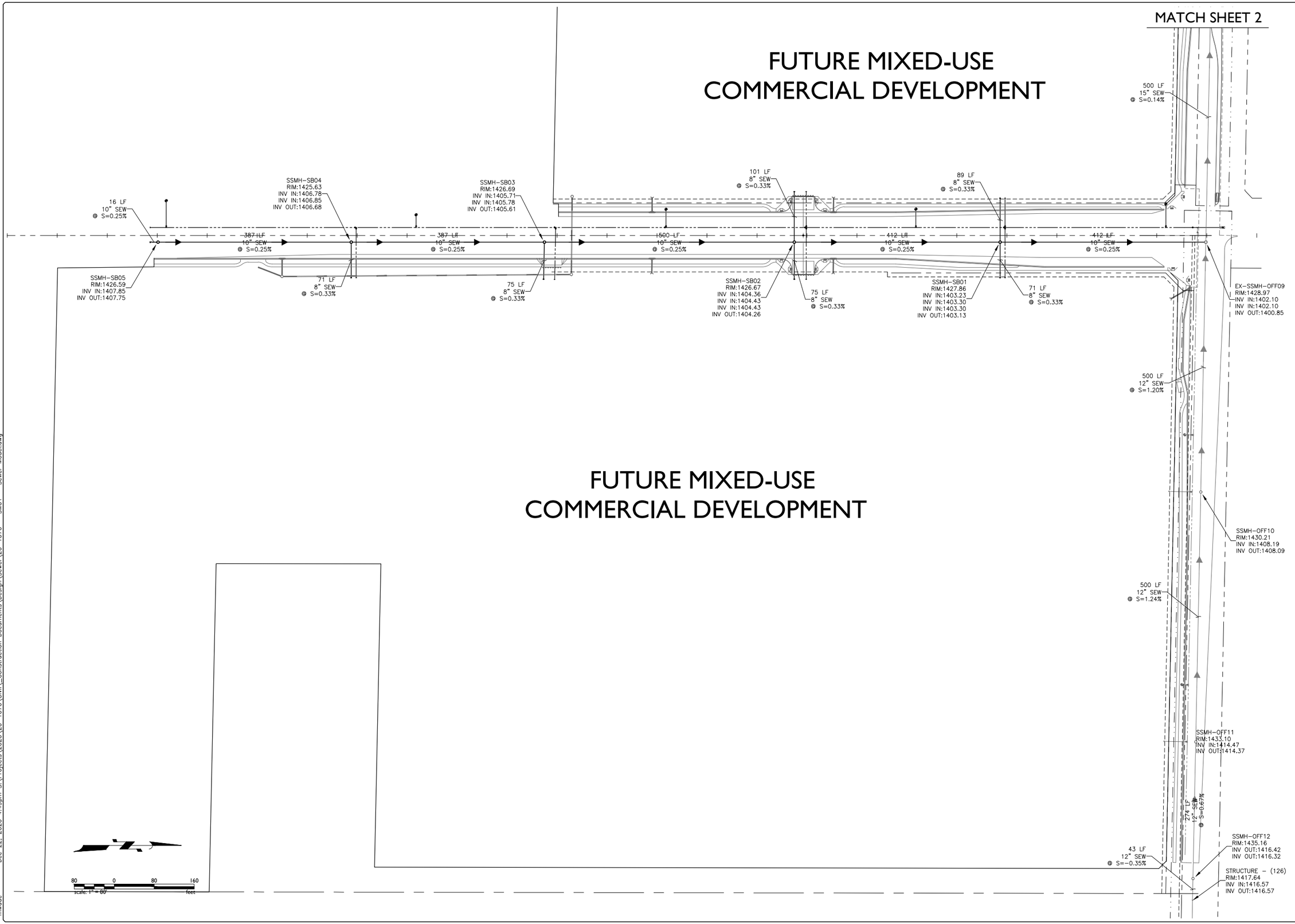
mwade

MATCH SHEET 2

FUTURE MIXED-USE
COMMERCIAL DEVELOPMENT



FUTURE MIXED-USE
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Project:
Destination @ Gateway - Berge
Offsite & Mass Grade
City of Mesa, Arizona

Sewer Model

Revisions:

Call at least two full working days before you begin excavation.
ARIZONA811
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602)263-1100

Designer: DMA
Drawn by: MSW

Job No.
20-1076

SM01

Sheet No.
1
of 2

20-1076: Destination @ Gateway - Berge - Offsite and Mass Grade

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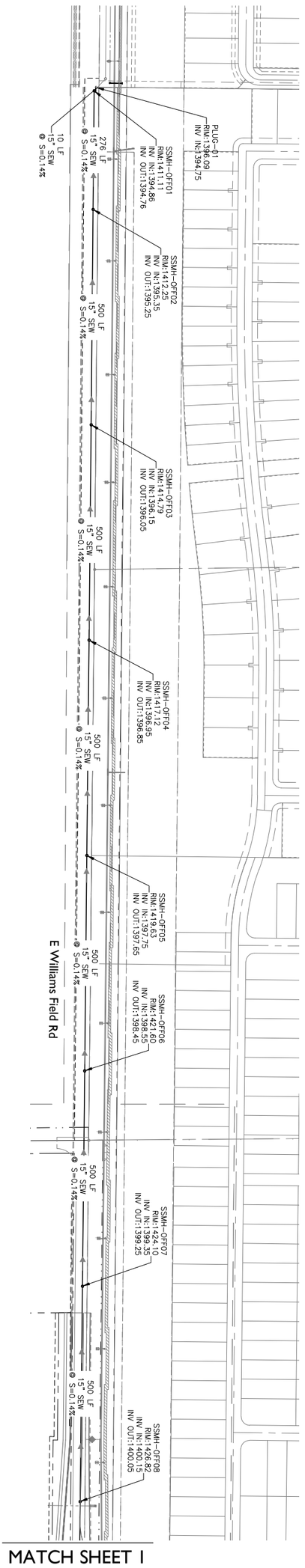

MATCH SHEET 1

SCALE 120 0 120 240 FEET

Job No.	20-1076
	EX02
Sheet No.	2 of 2
Designer:	DMA
Drawn by:	MSW
Revisions:	
Project:	Destination @ Gateway - Berge Offsite and Mass Grade City of Mesa, Arizona
	Sewer Model

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EXHIBIT C

OFFSITE AVERAGE DAILY FLOWS AND PIPE CAPACITY

Average Daily Sewer Flows and Pipe Capacity Using Manning's Equation

Project: Destination at Gateway - Berge

Prepared by: Marcus S. Wade **Date:** 12/23/2020

Calculations Assume 0.5 GPD/sf

Sewer Pipe Information					Additional Flow Information				Peak Demand Information						Full Flow Check		Non-Pressurized Flow Calculations					
Sewer Reach	Length (ft)	Pipe Diameter (in)	Slope (ft/ft)	Manning's Roughness	Description	Building Area (sf)	Other Additional Contributing Flow (GPD)	Additional Upstream Flow (GPD)	Cumulative Daily Flow (GPD)		Peaking Factor	Peak Demand (GPD)	Peak Demand (MGD)	Peak Demand (cfs)	Full Flow Capacity (cfs)	Pressurized Flow?	Theta of flow (rad)	Depth of Flow (ft)	Percent Full (d/D)	Area of Flow (ft2)	Wetted Perimeter of flow (ft)	Velocity of Flow (fps)
STUB01-SB05	16	10	0.0025	0.013	Signal Butte Road	348,321			174,161		3.00	522,482	0.522	0.808	1.10	NO	3.70	0.53	64%	0.3671	1.542	2.20
SB05-SB04	387	10	0.0025	0.013	Signal Butte Road	0			174,161		3.00	522,482	0.522	0.808	1.10	NO	3.70	0.53	64%	0.3671	1.542	2.20
SB04-SB03	387	10	0.0025	0.013	Signal Butte Road	0			174,161		3.00	522,482	0.522	0.808	1.10	NO	3.70	0.53	64%	0.3671	1.542	2.20
SB03-SB02	500	10	0.0025	0.013	Signal Butte Road	0			174,161		3.00	522,482	0.522	0.808	1.10	NO	3.70	0.53	64%	0.3671	1.542	2.20
SB02-SB01	412	10	0.0025	0.013	Signal Butte Road	0			174,161		3.00	522,482	0.522	0.808	1.10	NO	3.70	0.53	64%	0.3671	1.542	2.20
SB01-OFF09	412	10	0.0025	0.013	Signal Butte Road	0			174,161		3.00	522,482	0.522	0.808	1.10	NO	3.70	0.53	64%	0.3671	1.542	2.20
OFF12-OFF11	274	12	0.0067	0.013	Williams Field Road	0	31,320		31,320		3.00	93,960	0.094	0.145	2.92	NO	1.60	0.15	15%	0.0752	0.800	1.93
OFF11-OFF10	500	12	0.0124	0.013	Williams Field Road	0			31,320		3.00	93,960	0.094	0.145	3.98	NO	1.49	0.13	13%	0.0618	0.745	2.35
OFF10-OFF09	500	12	0.0120	0.013	Williams Field Road	0			31,320		3.00	93,960	0.094	0.145	3.91	NO	1.50	0.13	13%	0.0628	0.750	2.31
OFF09-OFF08	500	15	0.0014	0.013	Williams Field Road	0		174,161	205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86
OFF08-OFF07	500	15	0.0014	0.013	Williams Field Road	0			205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86
OFF07-OFF06	500	15	0.0014	0.013	Williams Field Road	0			205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86
OFF06-OFF05	500	15	0.0014	0.013	Williams Field Road	0			205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86
OFF05-OFF04	500	15	0.0014	0.013	Williams Field Road	0			205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86
OFF04-OFF03	500	15	0.0014	0.013	Williams Field Road	0			205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86
OFF03-OFF02	500	15	0.0014	0.013	Williams Field Road	0			205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86
OFF02-OFF01	276	15	0.0014	0.013	Williams Field Road	0			205,481		3.00	616,442	0.616	0.954	2.42	NO	2.88	0.54	44%	0.5136	1.803	1.86

Notes:

= Average Daily Flow Rate from Destination at Gateway residential subdivision that will impact the capacity of the proposed sewer line.

= Average Daily Flow Demand (GPD) from future Berge Car Dealership.